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One could almost *see* the growth. Another seed planted at the same time and in the same place germinated in one year. — HENRY GILLMAN, *Detroit, Mich.*

### ZOOLOGY.

THE GEOMETRID MOTHS. — The undersigned, desirous of perfecting as far as possible a monograph of the Geometrid moths, would beg the assistance of collectors, especially in the western and southern states, during the coming season. He would like information especially regarding the early stages, viz. : specimens and descriptions of the larva, chrysalis and their habits, as well as the food plants of any, even the most common species. Due credit will be given for any new facts. Out of about four hundred species in North America, we know of the caterpillars of but about twenty species. A number of illustrations<sup>1</sup> on the next page show the forms characteristic of this extensive family. The caterpillars are loopers or geometers, and are very familiar objects, feeding usually on low bushes and herbaceous plants late in summer.

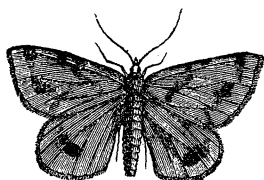
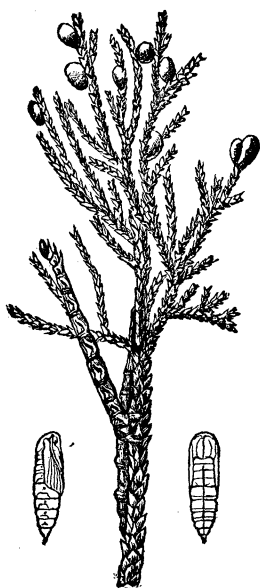
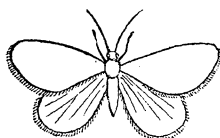
As every species known is to be figured, it is hoped that entomologists will lend their rarities, and thus aid in the publication of what, it is hoped, will be a useful contribution to the study of our moths. To those aiding by the loan of over twenty specimens, a copy of the work will be sent. The larvæ can be reared easily; full instructions may be found in the "Directions for preserving and collecting Insects," recently published by the Smithsonian Institution, and which can be had on application to the subscriber.

Any moths of this family sent to the subscriber will be named and carefully returned if desired. The work is about ready for the press, and specimens are desired at once. The collecting season is May, June and July, in the middle and northern states, June being the month when they are most abundant. — A. S. PACKARD, Jr.

A DOUBLE HEADED LARVA OF A FLY. — Professor Weyenbergh of Cordova, La Plata, describes a double headed larva of *Chironomus*. The body seems double throughout, though the two heads begin to unite on the second segment behind the head, and become fully united on the sixth.

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<sup>1</sup> Most of the cuts are kindly loaned by Prof. F. V. Hayden, having been taken from his annual report for 1873 on the Geology of Colorado Territory.

*Eufitchia ribearia.**Macaria Californiata.**Euaspilates spinataria.**Marmopteryx tessellata.**Aspilates 4-fasciaria.**Canlostoma occiduaria.**Drepanodes varus*, with larva and pupa.*Anisopteryx vernata.*

## EXAMPLES OF GEOMETRID MOTHS.

INFLUENCE OF ELEVATION AND LATITUDE UPON THE DISTRIBUTION OF SPECIES.—It is surprising to what extent observers still overlook the fact of the influence of elevation upon the distribution of animal and vegetable life ;—that they should still regard parallels of latitude, instead of isothermal lines, as bounding the habitats of species. That such is the case, however, is sufficiently apparent from such notices as that in the December NATURALIST, respecting the summer distribution of the chestnut-sided warbler (*Dendroica Pensylvanica*), which is but a sample of such remarks as frequently occur in reference to the distribution of our birds and mammals. The merest tyro in the study of the geographical distribution of animals knows that their range is not only determined by climatic influences, but that these influences depend largely upon the character of the surface of the country, as, for instance, whether it is a level plain or is broken by mountain ranges, and that increase in elevation is climatically equivalent to an increase in latitude. If authors would use isothermal lines in giving the distribution of a species, instead of arbitrary political divisions, they would be able to speak with much greater precision in such matters than is customary at present. The isotherms are now so well established, and a knowledge of them may be so easily acquired by means of our meteorological maps, that it seems quite time to adopt them in speaking of the distribution of species.

While southern New England may, generally speaking, form the southern limit of the breeding range of a bird, or of the distribution of a mammal, reptile or plant, the same species may, and generally does, exist in the highlands of the Alleghanies as far south as northern Georgia ; and even species which occur only to the northward of southern Maine, in the lowlands, not only occur in the highlands of Berkshire county, Massachusetts, but also southward in the Alleghanies to North Carolina.

A great point will be gained in precision when naturalists come to use natural faunal areas, instead of arbitrary political divisions, in speaking of the distribution of species. If Dr. Brewer had said, in speaking of the chestnut-sided warbler, "*not known to breed south of the Alleghanian Fauna*," instead of "*not known to breed farther south than Massachusetts*," he would not only have expressed the fact with precision, so far as our present knowledge extends, but would have saved himself the exposure to such criticism as that made by Mr. Stark (Am. Nat., VIII, p. 756, Dec.,

1874). I mention the present case merely by way of illustration, and not for the purpose of making any special strictures upon my friend Dr. Brewer, who is by no means in this respect an exceptional transgressor. If it is urged that the people would not understand such expressions as the "Alleghanian Fauna," and the like, it may be said that the time has come when they should be familiar with them. Most intelligent people know that isothermal lines vary in direction with the elevation and contour of the land over which they pass, sweeping, in our own country, far to the southward in leaving the lowlands of the Atlantic coast; that they pass southward of the Appalachian Highlands, and then bend abruptly northward again along their western base. It is time they knew, also, that the different zones of animal life follow the flexures of the isotherms, and that there are natural faunal belts, sufficiently distinct to be capable of recognition, whose boundaries coincide very nearly with certain of these isotherms. Furthermore, that throughout eastern North America, at least, these faunal belts are already well known to specialists of the subject, and that there already exist definite expressions for such cases as the one that has furnished the text for the present note. I will add, also, that so much is already known of the laws of the geographical distribution of animal life, that one could have safely assumed, from our present knowledge of the general range of the chestnut-sided warbler, that from its being a rather common summer resident in southern New England, it would also be found to breed in the mountainous districts as far south even as northern Georgia.—J. A. ALLEN.

#### GEOLOGY AND PALEONTOLOGY.

NEW ORDER OF EOCENE MAMMALS.—At the last meeting of the Connecticut Academy, Feb. 17th, Professor O. C. Marsh made a communication on a new order of Eocene Mammals, for which he proposed the name *Tillodontia*. These animals are among the most remarkable yet discovered in American strata, and seem to combine characters of several distinct groups, viz.: Carnivores, Ungulates and Rodents. In *Tillotherium* Marsh, the type of the order, the skull has the same general form as in the bears, but in its structure resembles that of Ungulates. The molar teeth are of the ungulate type, the canines are small, and in each jaw there is a pair of large scalpriform incisors faced with enamel, and grow-